



Cytogenetics of Silky desert mice, *Eligmodontia* spp. (Rodentia, Sigmodontinae) in central Argentina

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Abstract

Chromosomal features of *Eligmodontia typus* and *E. morgani* are described for six localities from central Argentina to better understand their geographic distribution. A chromosomal study of *Eligmodontia* revealed the finding of a $2n=34$ karyotype, previously described as an intrapopulation polymorphism, in 15 specimens from Laguna Blanca National Park, Neuquén. Information regarding the distribution of the $2n=44$ karyotype corresponding to *E. typus* in four localities of La Pampa and one of eastern Neuquén, Argentina is provided.

Introduction

Chromosomes have been shown to be a valuable means for the identification of specific status in many animal species. Through cytogenetic studies synmorphic taxa that for long had been considered single species, have been found to represent more than one taxon (BAKER 1984). The genus *Eligmodontia* Cuvier, 1837, whose species are known as highland desert or silky desert mice, has been considered monotypic (HERSHKOVITZ 1962; NOWAK and PARADISO 1983), despite the fact that up to seven putative species have been described (ORTELLS et al. 1989). Recently, the number of species recognized in the genus has ranged from three species which were based on karyological confirmation (STEPHAN 1995; *morgani* Allen, 1901, *puerulus* Philippi, 1896, and *typus* Cuvier, 1837) to six species where morphology was used as the primary taxonomic feature (BRAUN 1993; *hirtipes*, Thomas, 1902; *marica* Thomas, 1918, *moreni* Thomas, 1986, *morgani*, *puerulus*, and *typus*). In central and southern Argentina this genus is composed of two chromosomally distinct cytotypes (ORTELLS et al. 1989; KELT et al. 1991; ZAMBELLI et al. 1992), which are *Eligmodontia typus* with a diploid number of 43–44 chromosomes, and *E. morgani* with $2n=32-33$. Prior to these findings, generally all *Eligmodontia* in this area were referred to as *E. typus* (e.g. PEARSON et al. 1987), following the unifying criteria of CABRERA (1961) and HERSHKOVITZ (1962); but lately, Patagonian *Eligmodontia* have been recognized in ecological studies as *E. morgani* (PEARSON 1994; SABA and LAMO 1994). Recognizing that both taxa appear to be synmorphic and with a wide distribution, it would be necessary to ascertain their karyology in order to be able to assign systematic identification. Nevertheless a word of caution on the use of "chromosomal formulae as a diagnostic key to species identifications" was forwarded by MUSSER and CARLETON (1993) on the grounds of "the complex interdigitation of specific ranges among the ridges and valleys of the southern Andes" and the need of a revision of the genus. In addition, the other species of *Eligmodontia* for which chromosomal informa-

tion is available are *E. puerulus* with $2n = 50$, inhabiting southern Peru and western Bolivia (ORTELLS et al. 1989; KELT et al. 1991) and *E. moreni* from northern Argentina with $2n = 34$ (SPOTORNO et al. 1994).

Material and methods

A total of 27 *Eligmodontia* specimens were live-trapped with Sherman, Davis and wire mesh traps. The standard procedure of in-vivo colchicine mitotic arrest was used for obtaining chromosomes from bone marrow. In most cases the yeast stress method (LEE and ELDER 1980) was used to obtain a higher mitotic index. Slides were produced by dropping the cell suspension from a 50–60 cm height into a large drop of distilled water on the surface of the slide (BAKER et al. 1982). Chromosome slides were observed and photographed and the diploid number and chromosomal morphology was determined for each specimen from photographs. Voucher specimens were prepared as standard study skins and skulls and are housed in the collections of Texas Tech University Museum (TTU), and the collection of Universidad Nacional de Río Cuarto (UNRC).

Localities sampled (Fig. 1) and specimens studied: TK numbers identify slides and cell suspensions from voucher specimens.

Eligmodontia morgani

Neuquén: Zapala department: Laguna Blanca National Park ($n = 15$). TK 40245 male, TK 40248 female, TK 40266 female, TK 40287 male, TK 40291 female, TK 40292 male, TK 40293 male, TK 40294 female, TK 40295 female, TK 40298 female, TK 40299 female, TK 40300 male, TK 47601 male, TK 47602 male, TK 47603 female.

Eligmodontia typus

Neuquén: Zapala department, 20 km E Zapala ($n = 1$). TK 40239 male. La Pampa: Toay department: Estancia Los Toros, 12 km NNE Naicó ($n = 7$). TK 27886 male, TK 27887 female, TK 27890 male, TK 40618 male, TK 40623 male, TK 40624 female, TK 40629 male. Lihué Calel department, Puesto Las Lagunitas, 60 km SE Puelches ($n = 1$). TK 47610 female. Puelén department, 25 km SE Puelén ($n = 2$). TK 47612 female, TK 47613 male. Cerro Colón ($n = 1$). TK 47623 female.

Results and discussion

The geographic distribution of cytotypes is shown in figure 1 and the karyotypes of *Eligmodontia typus* and *E. morgani* are shown in figures 2 and 3 respectively.

Regarding *Eligmodontia typus*, the common usage has been to take for granted that the $2n = 44$ karyotype belongs to this species, existing also a $2n = 43$ variant (ORTELLS et al. 1989; KELT et al. 1991; ZAMBELLI et al. 1992). The $2n = 44$ karyotype described originally from Laguna Chasicó, Buenos Aires province (ORTELLS et al. 1989), seems to show little variation and is widespread throughout its range. It consists of a pair of large metacentric autosomes, 20 pairs of acrocentrics, and being the X chromosome a metacentric and the Y a subtelocentric (Fig. 2). This karyotype was found from a total of 12 specimens from all La Pampa and E Neuquén localities in which the $2n = 43$ variant was not detected.

At Laguna Blanca National Park a $2n = 34$ karyotype consisting of 16 pairs of acrocentric autosomic chromosomes, with the X chromosome telocentric and Y chromosome metacentric, was found in all 15 specimens studied (Fig. 3). Originally this karyotype was described by ZAMBELLI et al. (1992) for *Eligmodontia* sp. from one locality in Neuquén province, and one locality in Río Negro province. This results in a northward extension of about 120 km for this karyotype.



Fig. 1. Neuquén and La Pampa provinces, central Argentina with collecting localities: 1. Laguna Blanca National Park. 2. 20 km E Zapala. 3. 25 km SE Puelén. 4. Cerro Colón. 5. Puesto Las Lagunitas. 6. Estancia Los Toros. Asterisks denote the $2n = 44$ karyotype and the solid circle the $2n = 34$.

Previously, ORIELLS et al. (1989) had described $2n = 32$ – 33 karyotypes for specimens of *Eligmodontia* sp. The $2n = 32$ karyotype consisted of 14 pairs of acrocentric autosomes and a pair of small metacentrics. A polymorphism involving an heteromorphic pair composed of one small metacentric and two small acrocentrics produced the $2n = 33$ variant. For both karyotypes the X was telocentric and Y metacentric. Later, KELT et al. (1991) described further $2n = 32$ karyotypes from other Patagonian localities and gave reasons for the assignment of these forms to *E. morgani*. Furthermore, the 32, 33 and 34 variants were demonstrated, though G-banding and meiotic studies to “belong to one polymorphic system involving a Robertsonian fusion” (ZAMBELLI et al. 1992).

What is unusual is the fact that all the specimens studied from the Laguna Blanca population possess the $2n = 34$ karyotype, indicating that this chromosomal variant is fixed or that a more extensive distribution of all $2n = 34$ populations remains to be discovered.

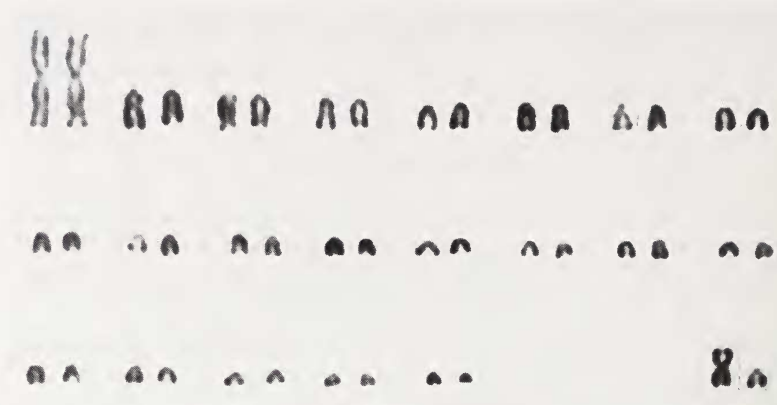


Fig. 2. *Eligmodontia typus* $2n = 44$ karyotype from 25 km SE Puelén, La Pampa (TK 47 613 male).



Fig. 3. *Eligmodontia morgani* $2n = 34$ karyotype from Laguna Blanca National Park, Neuquén. (TK 47 602 male).

ZAMBELLI et al. (1992) found the $2n = 32-33$ and $2n = 44$ cytotypes, of *Eligmodontia* sp. and *E. typus* respectively, in sympatry in two localities of Neuquén and Río Negro provinces. Unfortunately, detailed habitat data to support habitat segregation of the two species has not been described.

In this report both *Eligmodontia* karyotypes ($2n = 34$ and $2n = 44$) were found ca. 50 km apart in Neuquén province. The site in which the $2n = 34$ karyotype was found is located in a typical Patagonian shrub-steppe habitat with *Mulinum spinosum* being one of the dominant shrubs. Alternatively, the $2n = 44$ *E. typus* (a single specimen) locality 20 km E Zapala is found in the Monte Desert shrublands, comprised mostly of creosote bush (*Larrea divaricata*) and molle (*Schinus* sp.). How exactly the two cytotypes are distributed in specific habitats is yet to be documented. MARES et al. (1981) did find the morphological types to be habitat specific and this is comparable to the hypothesis that the distribution of cytotypes will reflect the habitat distribution.

It has been argued (MUSSEY and CARLETON 1993) of the possibility that the assignment of the $2n = 32-33$ karyotype to *E. morgani* by KELT et al. (1991) could be doubtful, considering that the specimens studied by these authors did not come from the type locality, but from 70 km away. These same karyotypes described by ORTELLS et al. (1989) were not assigned by these authors to any particular species and neither the $2n = 34$ variant discovered by ZAMBELLI et al. (1992). We suggest that the opinion of KELT et al. (1991) in the use of the name *morgani* for these polymorphic complex of $2n = 32$ to 34 should be followed until further research finally resolves this problem.

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Zusammenfassung

Cytogenetik von Seidenwüstenmäusen, Eligmodontia spp. (Rodentia, Sigmodontinae) in Mittelargentinien

Um zum Verständnis ihrer Verbreitung und Biogeographie beizutragen, werden chromosomale Merkmale von Arten der Gattung *Eligmodontia* aus Mittelargentinien beschrieben. Insbesondere werden chromosomale Besonderheiten von *Eligmodontia typus* und *E. morgani* aus sechs Gebieten in Mittelargentinien vorgestellt. Bei 15 Individuen aus dem Laguna Blanca Nationalpark, Neuquén, wurde ausschließlich der Karyotyp $2n = 34$ gefunden. Dieser Karyotyp war von anderen Autoren als Element eines Chromosomenpolymorphismus bei *Eligmodontia* beschrieben worden. Die Verbreitung des für die Art *E. typus* charakteristischen Karyotyps $2n = 44$ wird für vier Gebiete von La Pampa und ein Gebiet aus dem östlichen Neuquén dargestellt.

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